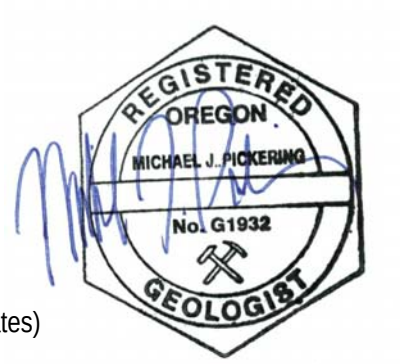
Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants



Memorandum

TO: Nicole LaFranchise (Port of Portland)

FROM: Michael Pickering (Ash Creek Associates)

cc: Sara Moore (Port of Portland), Stu Brown (Bridgewater Group), David Ashton (Port of Portland)

DATE: February 13, 2008

SUBJECT: Outfalls, Swan Island Upland Facility – Operable Unit 2
1115-05

Purpose

The purpose of this memorandum is to summarize the findings of research and site reconnaissance conducted by the Port of Portland (Port) to assess the historical or current presence of outfalls at Operable Unit 2 (OU2) of the Swan Island Upland Facility (SIUF) in Portland, Oregon (Figures 1 and 2).

Background

Integral is in the process of conducting reconnaissance of public and private storm water outfalls in the Portland Harbor for the Lower Willamette Group (LWG). The purpose of the outfall verification effort is to confirm the presence and location of harbor-wide outfalls in order to update the City of Portland's Geographic Information System (GIS) database. The Port provided Integral with assistance during review of outfalls at OU2. This memorandum documents the scope and results of the review.

Scope of Work Performed

To evaluate the current and historical presence of outfalls from OU2, the Port conducted the following:

1. Site visit including concurrent boat and land reconnaissance;
2. Review of available site records (including maps and drawings) to assess for drainage features that may have existed historically; and
3. Flow and dye testing of the parking lot drainage system.

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(503) 924-4704 Portland
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Results of Site Reconnaissance

On October 3, 2007, the Port, Ash Creek Associates (ACA), and Integral conducted a site visit to observe outfall pipe locations. The site visit was completed with concurrent boat and land reconnaissance. The weather conditions during the visit ranged from overcast and dry to light rain. Several storm events occurred within 24 hours prior to the site visit (Attachment A). Blackberries and other moderate to heavy vegetative cover were present on the riverbank.

Six pipes were observed in the vicinity of OU2 (Figure 3). Integral collected GPS coordinates at each location and recorded field observations (e.g., pipe construction, diameter, condition, and flow). A photograph log is included in Attachment B and the photograph locations are shown on Figure 2. The following table includes a summary of the field observations.

Integral Outfall ID	Pipe Diameter	Pipe Construction	Flowing Water?	Location	Outfall Present on Port AutoCAD Base Map?	Photograph Number
WR-158	18-inch	CMP	No	Under OU1 pier structure.	No	1
WR-399	18-inch	CMP	Yes	Adjacent to Vigor Parking Lot	Yes	2
CG-26	18-inch	CMP	No	Adjacent to Vigor Parking Lot	No	3
CG-27	18-inch	CMP	No	South of Vigor Parking Lot	No	4
WR-159a	18-inch	SMP	No	Near Center of OU2	No	5
WR-163	12-inch	CMP	Yes	OU2 Southern Boundary	Yes	n/a

Notes:
CMP = Corrugated metal pipe.
SMP = Straight metal pipe.
n/a = Not available.

Water was observed flowing from outfalls WR-399 and WR-163. This is consistent with our expectations based on the recent storm events and the apparent connections to upland storm water system components. No flow was observed from the other four pipe locations (described by Integral as abandoned). Outfall WR-158 is located north of OU2 on Operable Unit 1 (OU1). Outfall WR-163 is located southeast of OU2; it is connected to one catch basin located on the east end of OU2 and one or more catch basins located on the adjacent Freightliner parking lot.

Results of Site Records Review

A review of the historical reference materials the Port has compiled for OU2 was conducted to determine if documentation exists that would provide information on either the historical or current presence of outfalls at OU2. Details of this review are included below.

Current Storm System Plan. The Port's current base map shows a storm water conveyance system draining the parking lot and indicates that three outfalls are present. Two of these outfalls (WR-399 and WR-163) were identified in the field and had observed flow (i.e., active). The base map indicated the presence of a third outfall traversing OU2 with possible connections to N. Channel Avenue. However, neither the outfall nor any manholes along the inferred location of the line were observed in the field.

2006 Storm Water Pipe Abandonment. Three storm water pipes (WR-159, -160, and -164; Figure 3) were removed in July/August 2006 as they were no longer in use (ACA, 2007). These short sections of storm water conveyance pipe were located near the riverbank and collected water that intermittently puddled in the gravel parking area. The pipes were 8- to 12-inch-diameter, straight steel and were generally bedded at depths of less than 2 feet below the ground surface (bgs).

Historical Records. ACA reviewed the following documents for references to historical outfalls in the locations at OU2:

- DRAFT Supplemental Preliminary Assessment, Swan Island Upland Facility, Portland Oregon. Prepared by ACA/NewFields and dated December 2006.
- Remedial Investigation/Feasibility Study Work Plan for the Portland Shipyard, Portland, Oregon. Prepared by Bridgewater Group and dated November 2, 2000.

The above reports summarize available information on historical structures, site use, and history for the Facility. The DRAFT Supplemental Preliminary Assessment referenced Kaiser-era drawings, dated 1942, showing the storm water system. Drawings from 1942, 1964, and 1977 overlaid on the current Port base map are shown on Figures C-1 through C-3, respectively (Attachment C). The original drawings used to prepare the historical overlays are also included in Attachment C. Following are observations made from the review of these drawings.

Historical Storm Sewer/Outfall – Current Parking Lot. The Port's base map shows an additional outfall traversing OU2 with possible connections to N. Channel Avenue; however, neither the outfall nor any manholes along the inferred location of the line were observed in the field.

- 1942. The overlays of buildings and utilities were not consistent. This could be attributed to differences in design vs. as-built drawings, surveys, and other factors. A storm sewer feature which resembles the historical storm sewer/outfall from the Port base map (as described above) is present (a "Y"-shaped configuration). The "Y"-shaped storm feature was overlaid on the historical storm sewer/outfall and correlated well.
- 1964. The "Y"-shaped storm sewer configuration is also present. The eastern portion of the "Y"-shaped feature is designated as a sanitary sewer utility although, by this period, it would have been connected to the shown sanitary sewer trunk interceptor. The trunk sewer was installed in 1954 under the original Channel Avenue.
- 1977. The 1977 drawing presents as-built information for site features that were removed as part of the construction of the current parking lot. The overlay shows a deep manhole (20-foot) in the vicinity of the historical storm sewer/outfall that was removed. The historical storm sewer was likely removed as part of the construction activities.

WR-159a. The 1942 overlay shows a combined sanitary and storm sewer line which crossed OU2 to an outfall located in the vicinity of WR-159a, which was observed in the field.

No references to, or information on, any other historical outfalls were found in the above reports or historical drawings.

Flow and Dye Testing

Flow and dye tests were conducted in the drainage system of the parking lot located at the north end of OU2. The tests were completed to: (1) Ensure the system was functioning properly; (2) Confirm the storm system configuration; and (3) Make observations of the outfall pipes in the vicinity of OU2 (Figure 3). The results indicated that the OU2 catch basins drained to the mainline and to one outfall (City of Portland Designation WR-399; Figure 2). Cascade General/Vigor indicated that the only exception is catch basin STSCB2589. The results of the dye testing indicated that STSCB2589 does not drain to WR-399. No other information is available regarding the outfall location from STSCB2589. This catch basin is not part of the parking lot currently owned by the Port. No flow was observed from the other pipes in the vicinity of the parking lot (WR-158, CG-26, and CG-27).

Conclusions

Based on the activities reported above, six pipes were observed in the vicinity of OU2. Only two of the pipes are currently active outfalls (WR-163 and WR-399). This is consistent with the Port's current and historical understanding of the storm sewer systems present at OU2. The pipes at locations CG-26, CG-27, and WR-159a should be depicted as abandoned on the City of Portland's database and from maps depicting active outfalls along the river; it is not known what these pipes may have once drained. Background information on CG-26 and CG-27 was not identified in the historical research. WR-159a is likely a former combined sanitary and storm sewer.

Outfall WR-158 is on OU1 and is the responsibility of the current property owner (Cascade General/Vigor).

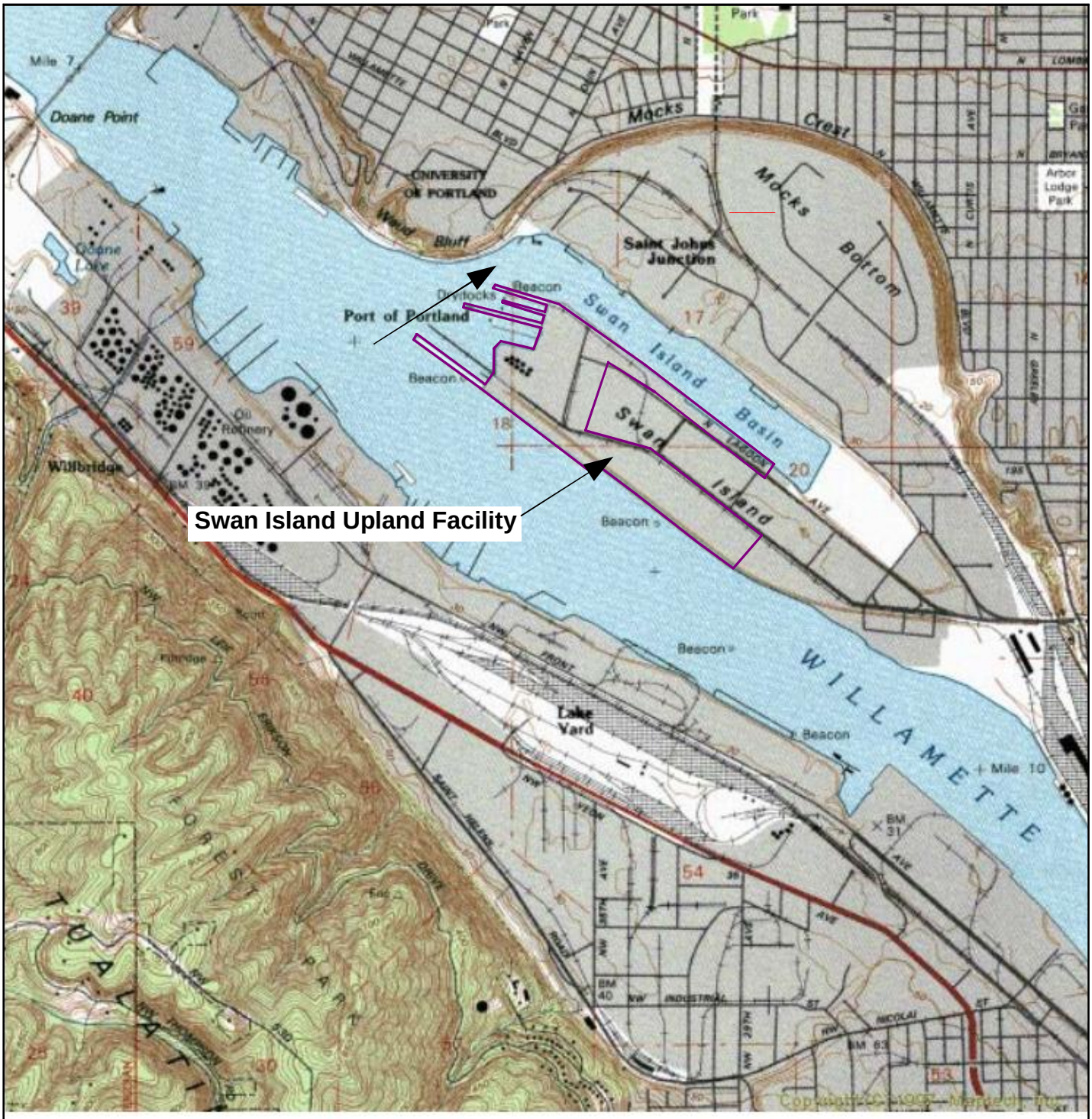
Attachments:

Figure 1 – Site Location Map
Figure 2 – Site Plan
Figure 3 – Outfall Observations

Attachment A – Supporting Information
Attachment B – Photograph Log
Attachment C – Historical Overlays

Reference:

ACA, 2007. Storm Water Piping Removal Oversight Memorandum, Swan Island Upland Facility, Portland, Oregon. Prepared by Ash Creek Associates. Dated June 22, 2007.



Base map prepared from USGS 7.5-minute quadrangles as provided by Topozone. (1990)

0 2000 4000

Scale in Feet

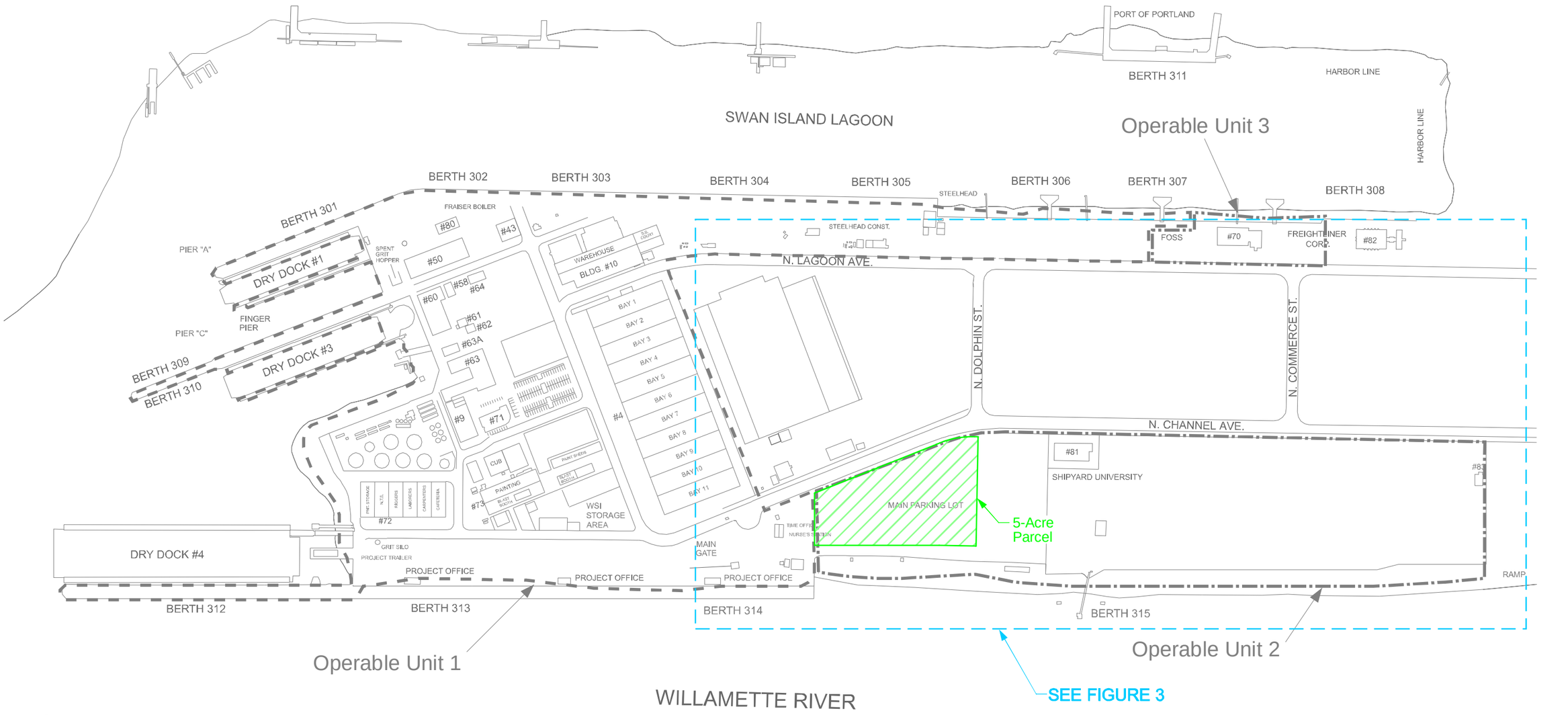
N

Site Location Map

Outfall Memo, Ou2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115	Figure
February 2008		1



Legend:

- Operable Unit 1 Boundary
- Operable Unit 2 Boundary
- Operable Unit 3 Boundary

0 400 800

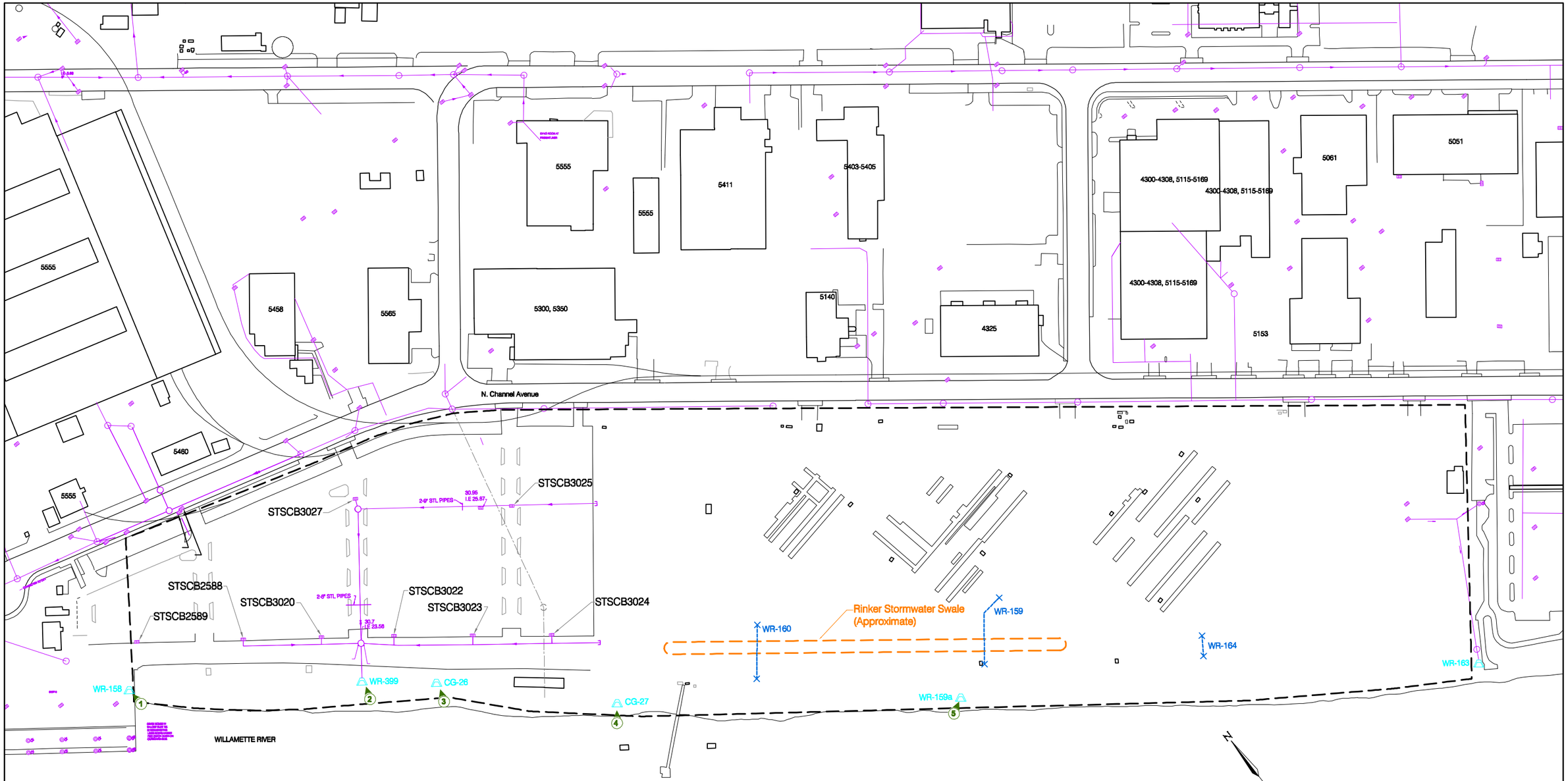
Scale in Feet

Site Plan

Outfall Memo, Ou2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115	Figure
February 2008		2



Legend:

- WR-399 — Outfall Location and Designation
- Catch Basin Location
- Manhole Location
- dr — Drain Location
- STS Location and Flow Direction (Port of Portland)
- 1 — Photograph Location, Number, and Direction Taken
- WR-160 — Storm Water Pipe Location and Designation (Abandoned July 2006)
- Historical STS (STS = Storm Sewer)
- Operable Unit 2 Boundary

NOTES:
1. Prepared from AutoCAD base map received from the Port of Portland in June 2007.
2. Outfall locations from Integral Consulting, Inc. GIS Export received by email on November 21, 2007.

Outfall Observations

Outfall Memo, OU2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115	Figure
February 2008		3

Attachment A

Supporting Information

RAINGAGE INFORMATION

Yeon Raingage - 3395 NW. Yeon Ave.

PROVISIONAL, UNCORRECTED RAW DATA FROM THE CITY OF PORTLAND HYDRA NETWORK.
Data are the number of tips of the rain gage bucket.
Each tip is 0.01 inches of rainfall.
[-, missing data]
Dates and times are PACIFIC STANDARD TIME.

	Daily	Hourly data -->																						
Date	Total	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
3-Oct-07	34	0	0	0	0	0	0	12	1	0	0	0	4	0	0	4	0	0	0	11	0	0	1	1	0
2-Oct-07	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	1	18	2	0	0	0	0
1-Oct-07	9	0	0	2	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility
Project Number: 1115-05
Client: Port of Portland
Location: Portland, Oregon

Photo No: 1 **Photo Date:** October 3, 2007 **Orientation:** North **Description:** Outfall WR-158 under OU1 pier. No flow. See Figure 3 for photograph orientation.	
Photo No: 2 **Photo Date:** October 3, 2007 **Orientation:** Northeast **Description:** Outfall WR-399. Flowing water. See Figure 3 for photograph orientation.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility
Project Number: 1115-05
Client: Port of Portland
Location: Portland, Oregon

Photo No: 3 **Photo Date:** October 3, 2007 **Orientation:** Northeast **Description:** Outfall CG-26. No flow. See Figure 3 for photograph orientation.	
Photo No: 4 **Photo Date:** October 3, 2007 **Orientation:** Northeast **Description:** Outfall CG-27. No flow. See Figure 3 for photograph orientation.	

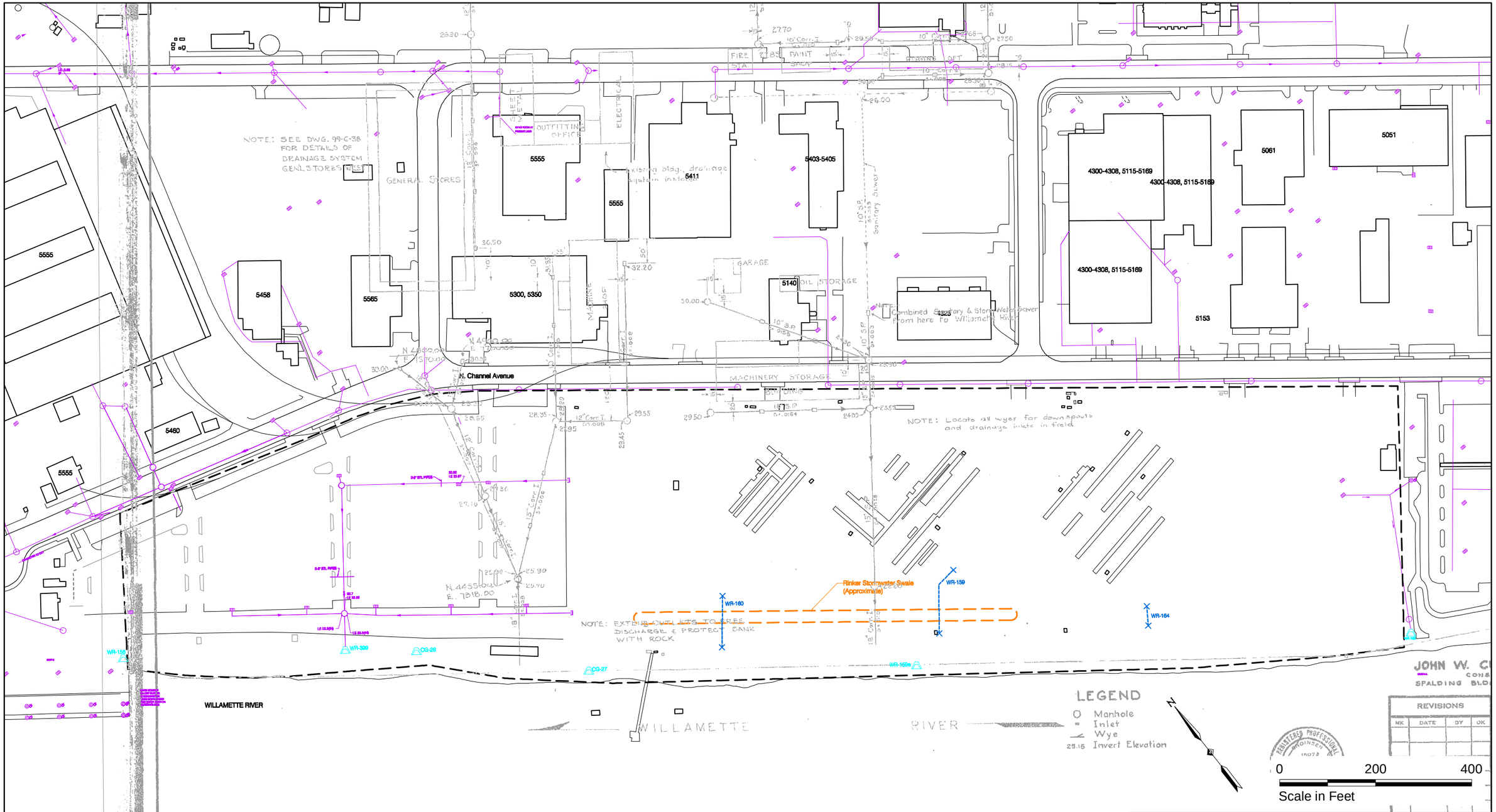
ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility
Project Number: 1115-05
Client: Port of Portland
Location: Portland, Oregon

Photo No: 5	
Photo Date: October 3, 2007	
Orientation: Northeast	
Description: Outfall WR-159. No flow. See Figure 3 for photograph orientation.	

Attachment C

Historical Overlays



Legend:

- WR-399 — Outfall Location and Designation
- Catch Basin Location
- Manhole Location
- dr — Drain Location
- STS Location and Flow Direction (Port of Portland)
- WR-160 — Storm Water Pipe Location and Designation (Abandoned July 2006)
- Historical STS (STS = Storm Sewer)
- Operable Unit 2 Boundary

NOTES:

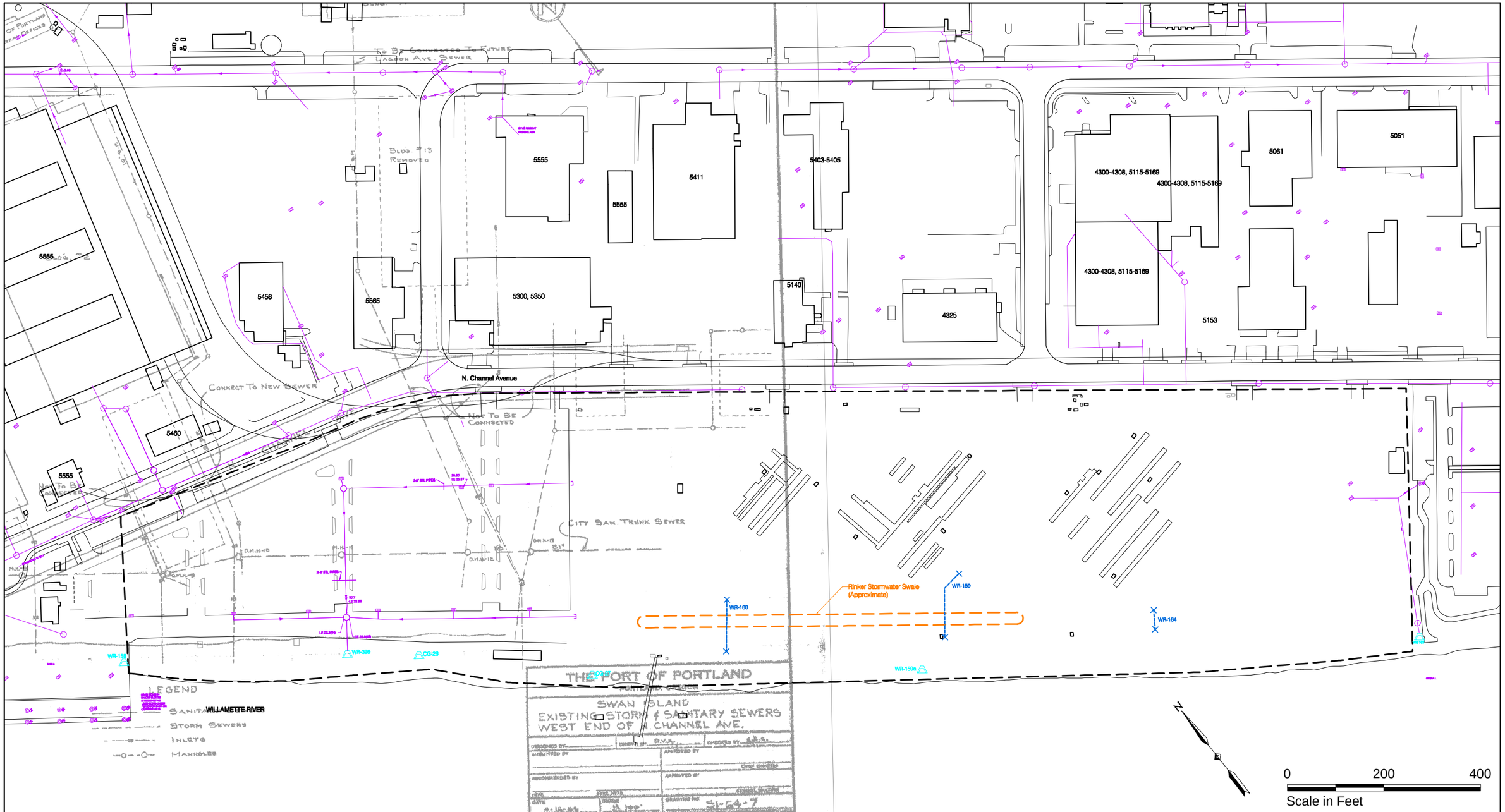
1. Prepared from AutoCAD base map received from the Port of Portland in June 2007.
2. Outfall locations from Integral Consulting, Inc. GIS Export received by email on November 21, 2007.
3. Overlay prepared using Port of Portland Drawing MU SI 1942 1005 00 0004 0.

1942 Overlay

Outfall Memo, OU2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115	Figure
February 2008		C-1



Legend:

- Outfall Location and Designation (WR-399)
- Catch Basin Location
- Manhole Location
- Drain Location (dr)
- STS Location and Flow Direction (Port of Portland)
- Storm Water Pipe Location and Designation (Abandoned July 2006) (WR-160)
- Historical STS (STS = Storm Sewer)
- Operable Unit 2 Boundary

NOTES:

1. Prepared from AutoCAD base map received from the Port of Portland in June 2007.
2. Outfall locations from Integral Consulting, Inc. GIS Export received by email on November 21, 2007.
3. Overlay prepared using Port of Portland Drawing CD SI 1964 0007 00 00010.

1964 Overlay

Outfall Memo, OU2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1115

February 2008

Figure C-2

N. Channel Avenue

5460

5555

WILLAMETTE RIVER

WR-158

WR-399

CG-26

CG-27

2-8" STL PIPES

30.7
I.E 23.56

30.95
I.E 25.87

MH 20' DEEP

CONCRETE BUILDING

EDGE OF EXISTING LANDSCAPING

PK NAIL & STREET

0 100 200

Scale in Feet

Legend:

- Outfall Location and Designation
- Catch Basin Location
- Manhole Location
- Drain Location
- STS Location and Flow Direction (Port of Portland)
- Storm Water Pipe Location and Designation (Abandoned July 2006)
- Historical STS (STS = Storm Sewer)
- Operable Unit 2 Boundary

NOTES:

1. Prepared from AutoCAD base map received from the Port of Portland in June 2007.
2. Outfall locations from Integral Consulting, Inc. GIS Export received by email on November 21, 2007.
3. Overlay prepared using Port of Portland Drawing CD YA 1977 0011 00 0002 0.

1977 Overlay

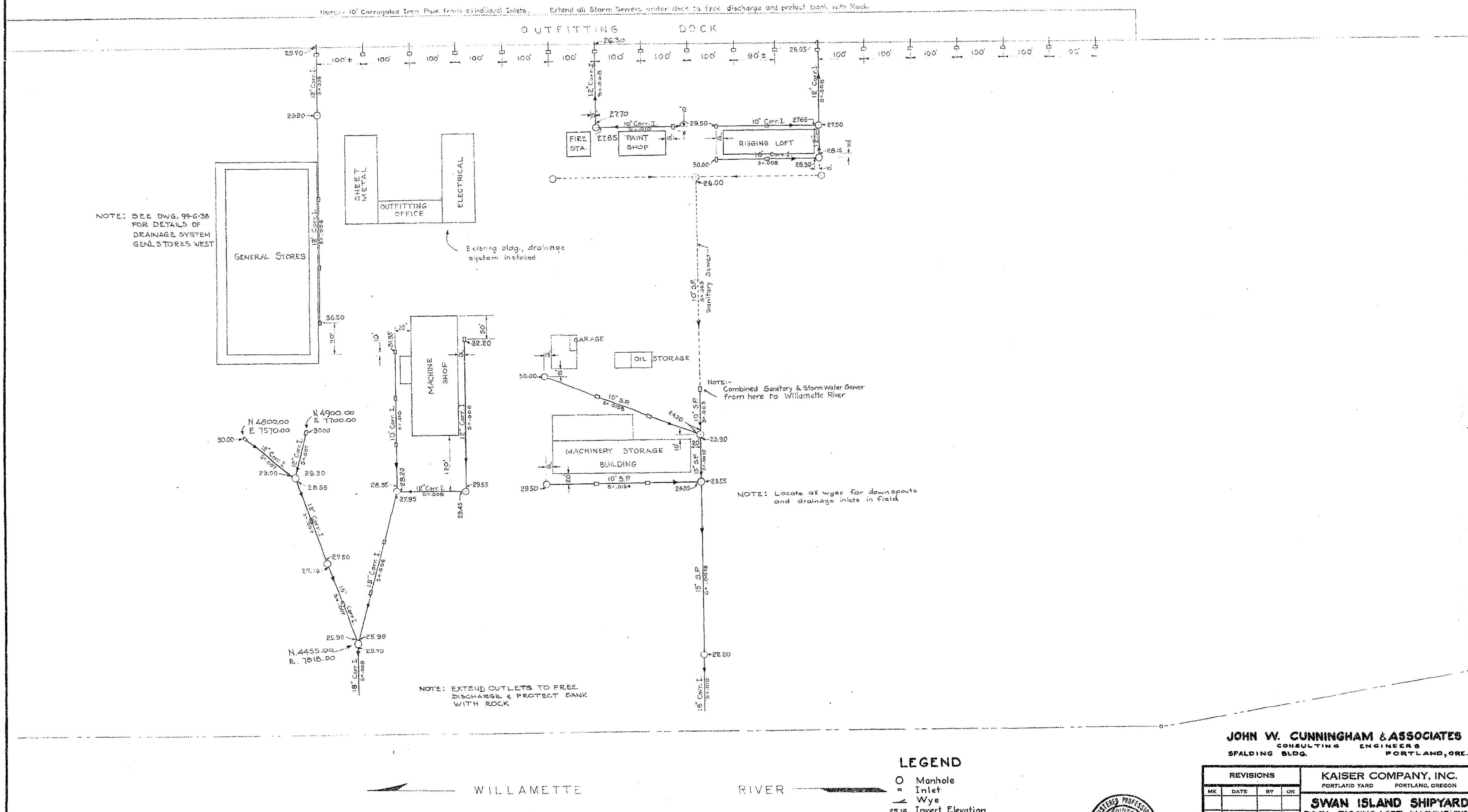
Outfall Memo, OU2
Swan Island Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1115

February 2008

Figure C-3



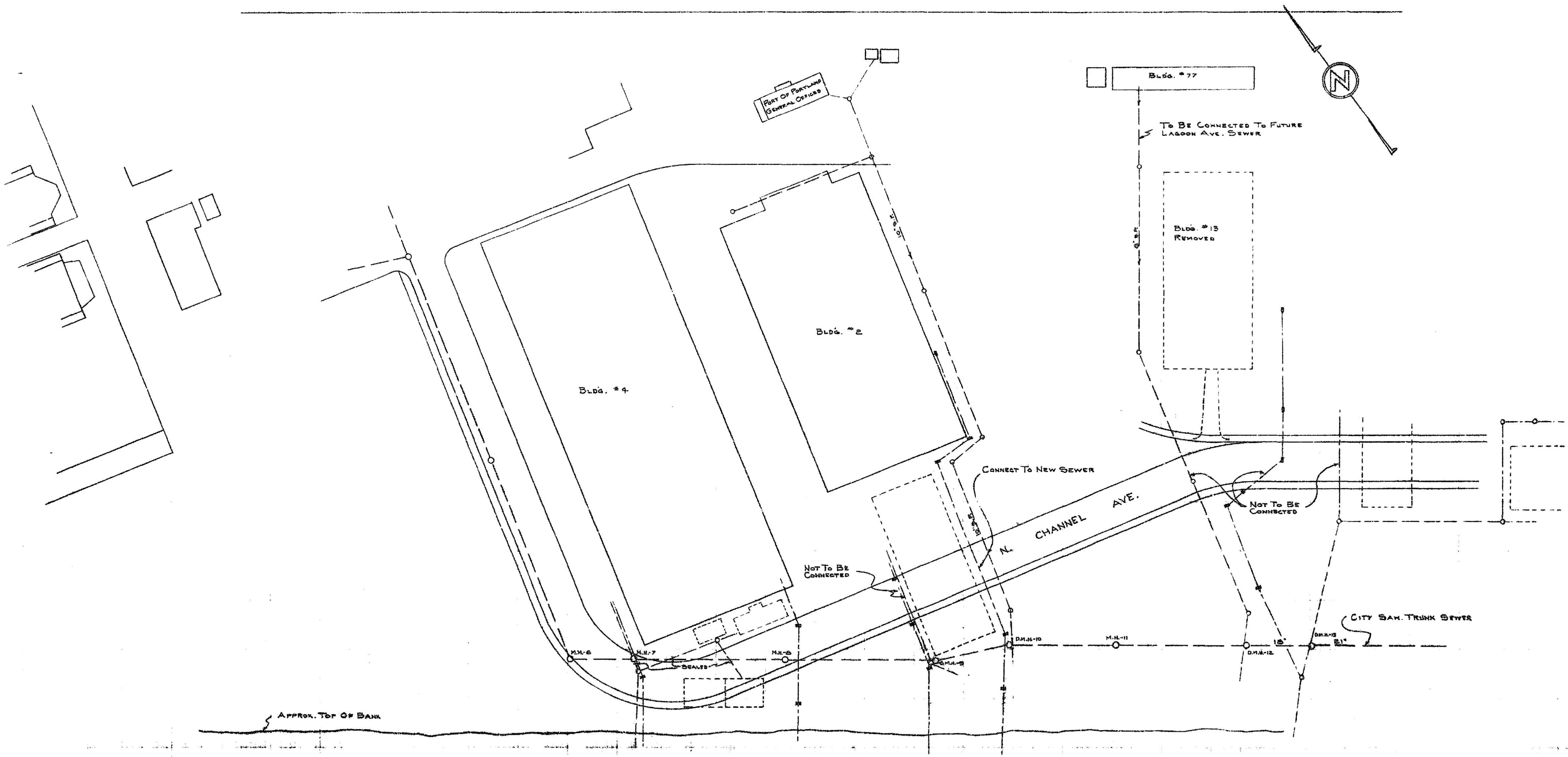
Note:- 10" Corrugated Iron Pipe from all individual Inlets. Extend all Storm Sewers under dock to free discharge and protect bank with Rock.
OUTFITTING DOCK
25.70
100'±
100'
90'±
26.30
26.05
12" Corr. I. S=.008
28.90
SHEET METAL
OUTFITTING OFFICE
ELECTRICAL
Existing bldg., drainage system installed
NOTE: SEE DWG. 99-G-38 FOR DETAILS OF DRAINAGE SYSTEM GEN'L STORES WEST
GENERAL STORES
30.50
70'
27.70
10" Corr. I. S=.015
27.85
FIRE STA.
PAINT SHOP
29.50
10" Corr. I.
27.65
27.50
RIGGING LOFT
10" Corr. I. S=.008
30.00
28.30
28.15
26.00
10" S.P. S=.003
Sanitary Sewer
GARAGE
OIL STORAGE
31.35
32.20
50'
MACHINE SHOP
10" Corr. I. S=.010
12" Corr. I S=.008
120'
28.35
28.20
27.95
12" Corr. I. S=.008
29.55
29.45
30.00
10" S.P. S=.0158
24.30
NOTE:- Combined Sanitary & Storm Water Sewer from here to Willamette River
10" S.P. S=.003
23.90
MACHINERY STORAGE BUILDING
15" S.P. S=.0035
29.50
10" S.P. S=.0164
24.00
23.55
NOTE: Locate all wyes for down spouts and drainage inlets in field
N 4800.00 E 7570.00
N 4900.00 E 7700.00
30.00
12" Corr. I. S=.007
29.00
29.30
28.65
12" Corr. I. S=.007
27.30
27.10
15" Corr. I. S=.007
15" Corr. I. S=.006
25.90
25.90
25.70
N. 4455.00 E. 7818.00
18" Corr. I. S=.008
15" S.P. S=.0035
22.80
18" Corr. I. S=.010
NOTE: EXTEND OUTLETS TO FREE DISCHARGE & PROTECT BANK WITH ROCK
WILLAMETTE RIVER
LEGEND
O Manhole
▫ Inlet
Wye
25.15 Invert Elevation

REGISTERED PROFESSIONAL ENGINEER 1507 OREGON MAY 11, 1931 CARL E. GREEN

JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, ORE.

REVISIONS				KAISER COMPANY, INC. PORTLAND YARD PORTLAND, OREGON	
MK	DATE	BY	OK	**SWAN ISLAND SHIPYARD** DOCK, RIGGING LOFT & MACHINE SHOP **STORM SEWER SYSTEM**	
				DATE 6-5-42	SUBMITTED
				SCALE 1" = 100'	APPROVED
				DRAWN BY C.E.G.	99-6-112
				CHECKED BY	

S.I. 42-1005 4/5



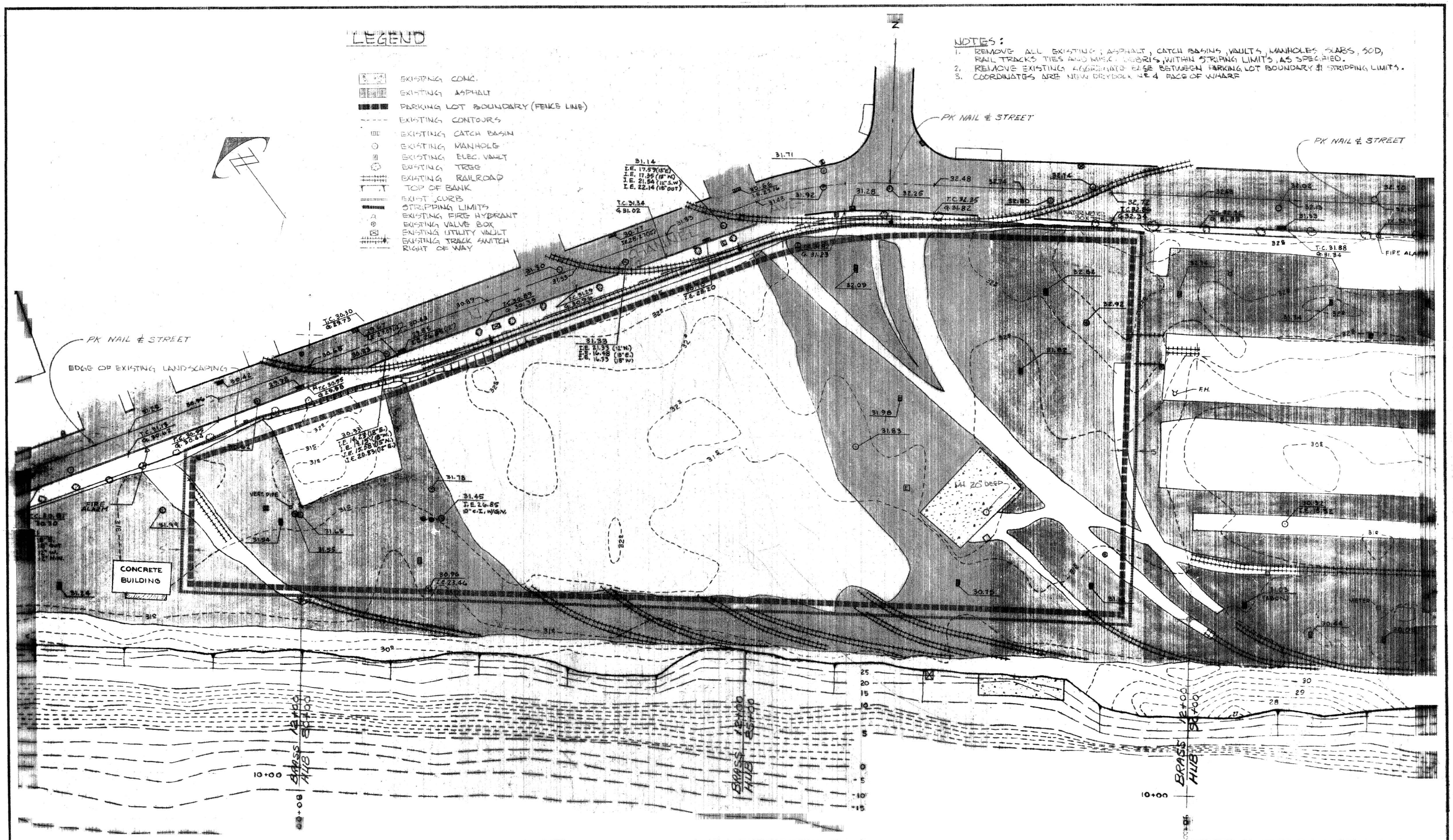
LEGEND

— — —	Sanitary Sewers
– — – —	Storm Sewers
- —◆— -	Inlets
—O— -O—	Manholes

THE PORT OF PORTLAND
PORTLAND, OREGON

SWAN ISLAND
EXISTING STORM & SANITARY SEWERS
WEST END OF N. CHANNEL AVE.

DESIGNED BY: | DRAWN BY: D.V.K. | CHECKED BY: [illegible]
SUBMITTED BY | APPROVED BY — CHIEF ENGINEER
RECOMMENDED BY | APPROVED BY — GENERAL MANAGER
DATE: 4-16-64 | SCALE: 1" = 100' | DRAWING NO. SI-64-7


LEGEND
EXISTING CONC.
EXISTING ASPHALT
PARKING LOT BOUNDARY (FENCE LINE)
EXISTING CONTOURS
EXISTING CATCH BASIN
EXISTING MANHOLE
EXISTING ELEC. VAULT
EXISTING TREE
EXISTING RAILROAD
TOP OF BANK
EXIST. CURB
STRIPPING LIMITS
EXISTING FIRE HYDRANT
EXISTING VALVE BOX
EXISTING UTILITY VAULT
EXISTING TRACK SWITCH
RIGHT OF WAY
NOTES:
1. REMOVE ALL EXISTING ; ASPHALT, CATCH BASINS, VAULTS, MANHOLES, SLABS, SOD, RAIL TRACKS TIES AND MISC. DEBRIS, WITHIN STRIPING LIMITS, AS SPECIFIED.
2. REMOVE EXISTING AGGREGATE BASE BETWEEN PARKING LOT BOUNDARY & STRIPPING LIMITS.
3. COORDINATES ARE NEW DRYDOCK Nº 4 FACE OF WHARF
PK NAIL & STREET
PK NAIL & STREET
PK NAIL & STREET
EDGE OF EXISTING LANDSCAPING
CHANNEL AVE.
CONCRETE BUILDING
FIRE ALARM
VERT. PIPE
MH 20" DEEP
F.H.
WATER METER BOX
FIRE ALARM
METER
31.14
I.E. 17.59 (18" E)
I.E. 17.35 (18" W)
I.E. 21.54 (12" S.W)
I.E. 22.14 (18" OUT)
T.C. 31.34
G. 31.02
31.71
32.48
32.25
31.28
31.92
T.C. 32.35
G. 31.82
32.74
32.14
32.80
32.72
T.C. 32.86
G. 32.34
32.02
32.50
31.33
T.C. 31.88
G. 31.34
32.09
32.84
32.92
31.82
31.33
I.E. 21.33 (12" N.)
I.E. 16.48 (18" E.)
I.E. 16.33 (18" W.)
T.C. 30.30
G. 29.73
30.42
29.98
T.C. 30.55
G. 29.98
31.25
T.C. 31.13
G. 30.62
T.C. 30.95
G. 30.44
30.62
30.33
I.E. 14.23 (18" E.)
I.E. 14.15 (18" W.)
I.E. 15.58 (15" N.)
I.E. 20.83 (12" E.)
31.78
31.45
I.E. 26.85
10" C.I. W/G.V.
31.99
31.54
31.65
31.55
31.24
30.96
I.E. 23.46
31.98
31.83
30.75
30.32
I.E. 15.32
31.03
30.44
30.89
T.C. 30.89
G. 30.39
T.C. 31.29
G. 30.96
31.30
31.33
30.77
30.66
I.E. 27.16
31.43
31.35
BRASS HUB
BRASS HUB
BRASS HUB
10+00
10+00
10+00
25
20
15
10
5
0
-5
-10
-15
30
29
28
27

NO	DATE	BY	REVISIONS	CK'D	APP'V'D	NO	DATE	BY	REVISIONS	CK'D	APP'V'D
						1	10-24-77	ALL	AS CONSTRUCTED	VMH	RJW

THE PORT OF PORTLAND
PORTLAND, OREGON

REGISTERED PROFESSIONAL ENGINEER 5367 OREGON JULY 9, 1954 KENNETH R. ASBURY, JR.
Kenneth R. Asbury Jr.

DESIGNED BY K. ASBURRY
DRAWN BY M. CARPENTER
CHECKED BY K. ASBURRY
DATE FEB. 1977
SCALE 1"=50

SWAN ISLAND SHIP REPAIR YARD EXPANSION
PARKING LOT
EXISTING TOPOGRAPHY

SUBMITTED BY [signature]
DRAWING NO. YA 77-11 2/11 1

CHARLES BRUNING CO.

MICROFILMED